Author’s response to reviews

Title: Factors associated with tungiasis among primary school children: a cross-sectional study in a rural District in Rwanda

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Author’s response to reviews:

Kigali, Rwanda
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Dear Editor-in-Chief:

On behalf of our study team, I would like to submit a revised version of the manuscript PUBH-D-19-01149 “Prevalence and factors associated with tungiasis among primary school children: a cross-sectional study in a rural district in Rwanda”. We would like to thank you for the opportunity to revise our article and appreciate the positive points cited in your letter. We have responded to the editor and reviewers’ comments as below.

We hope the concerns raised by the editor and reviewers have been addressed adequately and that the manuscript will meet your approval for publication in the Journal.
Looking forward to hearing from you.

Sincerely,

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Editor’s Comments Authors’ answer to the comments
Study design - How were schools selected? Thank you for the relevant question. The Schools were selected purposively. No random procedure was applied when selecting these schools. Our intention was to involve schools located in remote rural area, where the likelihood of having more cases of tungiasis would be increased. These schools should also not be distant from each other because of financial constraints since our study had no funding. We inserted this comment in the revised manuscript.

Please explain how you defined variables—clean/dirty feet and clothes, wearing shoes regularly, etc.

We appreciate this comment and have defined the indicated variables, as suggested. Dirty feet or clothes were those having dust or not washed. Wearing shoes regularly was considered as putting on always shoes when at home or elsewhere. Wearing shoes irregularly was considered as using shoes only when going to school or special circumstances such as going to the church or other public events. Walking barefoot was considered as never wearing shoes.
How was tungiasis defined? A case definition is required.

A case definition for tungiasis was considered in a revised manuscript. The definition was based on clinical manifestations based on skin lesions, suggesting the tungiasis infestation. These lesions were detailed in the resubmitted manuscript.

It would be helpful to include your questionnaire as supplementary material. We have addressed this comment when resubmitting our manuscript.

I do not understand the age ranges in table 4.1. How is it possible you have people >15 years old in a primary school?

We appreciate this comment and agree that age groups may be confusing based on the fact that the study included pupils at primary school. In Rwanda, regular pupils finish the primary school at the age of 12 years. However, due to multiple interruptions caused, for example, by chronic illnesses and extreme poverty, some pupils may delay completing their studies. In our study, we had some pupils who returned to school after some period of dropout due to poverty or diseases. These pupils were older than others and some of them were above 15 years of age.

It is not clear from the Methods section how many multivariable logistic regression models were done. In these models, what variables were included? How were they selected? Why wasn’t multivariable analysis done for school attendance and performance?

We thank you for raising up this comment about our analyses. Variables included in the multivariate analysis or adjusted analysis were those, which had significant odd ratios after the
bivariate analysis or crude analysis. We have split variables into two categories: those considered as factors leading to tungiasis infestation such as walking barefoot and those considered as consequences of tungiasis infestation such as poor performance at school. These categories have informed the creation of two logistic regression models while doing our analyses. Further details are described in the revised manuscript.

What was the response rate of the survey? Please review the STROBE guidelines for cross-sectional observational studies and make sure everything is included.

The response rate of the survey was 100%, All respondents have successfully completed the interviews. No missing data were recorded. This information was provided in the section of descriptive results in the revised manuscript. Guidelines on Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) were scrutinized to ensure that our study is following them. This can be observed in the revised manuscript.

Where are the results from your chi-square tests? Results from chi-square are now incorporated in the results’ section.

Tables should be able to stand alone. The title for table 4.3 doesn’t provide enough information. We agree that a table should stand alone. We have rewritten all tables and their titles.

Please review your calculations for odds ratios—some of them do not seem correct (e.g. ORs >100)

This comment was well noted and addressed accordingly. However, due to a relatively high number of variables entered in the same model when doing the adjusted analysis, some variables have seen their ORs and confidence intervals changing tremendously. Such variations usually do not occur when there is a bigger sample size. Future research should consider including more participants to increase the power of sample and prevent any shaky sample.

I do not understand your Abbreviations list. Nowhere in your manuscript do you mention AIDS, CDC, DPDx, HBV HIV, pH, etc.

We appreciate this comment. We have taken care of incorporating the list of all abbreviations used in the revised manuscript.

Reviewer’s comments

Authors’ answer to the comments

Abstract:

Results: Illiteracy of the mother was the factor associated with tungiasis. -> This implicates there were no more factors?

We agree that this finding was not well written. We have addressed this comment in the current manuscript.

There should be a more detailed introduction into the disease of tungiasis. Some key information is missing: cause by penetration of female sand flea into the skin of its host; on-host and off-host cycle; zoonosis; acute and chronic pathology. This information is important for reader not knowing tungiasis. If the know that also animals are infested by sand fleas, they can better understand why it can be a risk factor to possess animals at home.

We agree that some information was lacking in the introduction and have clarified by expanding it and including information that was missing on causes, development, and transmission of tungiasis.

Page 4, passage 1: should read: … infestation with Tungapenetrans, also known as a jigger flea or sand flea.

We appreciate this suggestion. We rewrote this section accordingly.

Page 4, passage 2, listing of factors underlying tungiasis: the factors should be summed up. (The study does not really generate new aspects as all factors that are found out to be associated with tungiasis are
already known to be such.)

We appreciate this suggestion. We rewrote this section accordingly.

P4, passage 3: should read: … was associated in severe itching, intense pain, difficulty in walking and social stigma, which made it hard for school children to reach school and attend class, concentrate in class, or remain in school (3,11,12). As a result of tungiasis pupils may have a poor performance and fail to proceed to the next classes (13).

We appreciate this suggestion. We rewrote this section accordingly.

P4, passage 4: citation is missing after the sentence: Programs aiming at preventing and treating tungiasis at community level have been strengthened.


Nordin, Per, et al. "Treatment of tungiasis with a two-component dimeticone: a comparison between moistening the whole foot and directly targeting the embedded sand fleas." Tropical medicine and health 45.1 (2017): 6. We appreciate this comment and articles suggested for further reading. We rewrote this section and tried to complete the missing information in relation to the programs for preventing tungiasis. The suggested literature on these programs was also utilised.


Nordin, Per, et al. "Treatment of tungiasis with a two-component dimeticone: a comparison between moistening the whole foot and directly targeting the embedded sand fleas." Tropical medicine and health 45.1 (2017): 6. We appreciate this comment and articles suggested for further reading. We rewrote this section and tried to complete the missing information in relation to the programs for preventing tungiasis. The suggested literature on these programs was also utilised.

Design: Why did you choose to conduct a cross-sectional study? Why not a case-control study to find out risk factors getting tungiasis? In a case-control study the groups are better comparable. As only few pupils of the 384 participants had tungiasis, the sample size of participants, which are interesting for the study, gets very small… Why is the data prospectively collected? There is only one point in time where the situation is observed and factors are inquired, right? Or did you check the variables multiple times? I think it would be helpful to get the opinion of an epidemiologist at this point. We thank the reviewer for the relevant questions and comments. A cross-sectional study design was preferred over a case-control study since we aimed at assessing prevalence of tungiasis in addition to factors associated to this neglected tropical disease. We agree that in a case-control design groups are better comparable and this type of design is suitable for analysing risk factors for tungiasis. We also agree that increased sample is needed since it goes with increased power of the sample, which influences the validity of results. However, due to the lack of funding we were unable to involve more schools in our study. We would apologise if the following part of sentence was unclear: “…data prospectively collected”. We wanted to specify that the data was collected over time in a population, where new cases of tungiasis could occur. This required a follow-up in order to record new cases. However, we have addressed this comment in a revised manuscript by taking away “prospectively”.

Setting: Please give also information about the schools. E.g. they are built from which materials? How big are the classes? We appreciate this question and have answered to it in a revised manuscript. We have elaborated on the characteristics of classes in terms of materials utilised when building them.

Setting, passage 1: How is the poverty rate in Rwanda assessed? Please indicate the measurement category. We thank the reviewer for this comment. Statistics on the poverty rates in Rwanda are provided by the National Institute of Statistics of Rwanda. This Institute ranks the wealth of the population based on household’s assets and facilities, and housing conditions (possession of some items at home such as radio, television, electricity, car, motorbike, materials in which roofs, floors, walls are
made, type of toilet, source of drinking water and energy for cooking etc.). Each item is assigned a specific weight using a principal component analysis, which help determine an asset index ranking households into 5 wealth quintiles (poorest, poorer, middle, richer, richest). However, the measurement of socioeconomic status (SES) of our population was not part of our objectives. Thus, this variable SES was not assessed. We only referred to the poverty when talking to the district, where our research was implemented. According to the national statistics, this district had the highest poverty rate in the country.

Setting, passage 2: should read: … Tungapenetrans removal …

We agree that this should read, as suggested

Population and sample size calculation: What is d = 0.05? Do you mean e = 0.05?

We have rectified this error by writing e=0.05 instead.

Sampling technique: Why did you adapt the skip interval technique depending on the size of the school, so that at the end of the sampling 128 pupils came from each school? Like this the smallest school is proportionally overrepresented, which could have an impact on the results, especially as the living environment is part of the observation (I guess pupils from primary school visit their closest school). I think it would be helpful to get the opinion of an epidemiologist at this point.

This is a relevant point. We have applied the skip interval technique as one of the approaches indicated when selecting sample members from larger population, which was the case for our study. The skip interval depends upon the size of larger population and the size of the sample to be withdrawn from this larger population. We decided to select 128 participants from each school since we applied a systematic or a non-random sampling technique. We have discussed this sampling method as a study limitation. However, we believe that this limitation would not have affected the overall pattern of our findings since the three schools were located in the same setting with similar characteristics. In addition, when selecting participants within each school, the skip interval was proportional to the total number of children, which would have minimised any selection bias. Future research should consider using a random number proportional to the population size of each school.

Sampling technique, passage 2: Should read: … starting from primary school one to primary school three (not six) …

We agree that this section needs to be rewritten and have addressed this.

Data collection: How was tungiasis infestation assessed? Did you use the rapid method (Ariza, L., et al. "A simple method for rapid community assessment of tungiasis." Tropical Medicine & International Health 15.7 (2010): 856-864)? How was the setting of examination? Did you use any tool like dermatoscopy? Or did you only asked the children if they had tungiasis or not? Did you verify that?

Tungiasis was clinically assessed by inspection through direct observations of skin lesions, suggesting the infestation. Further details around the history of these lesions were also requested for. We were not able to apply the rapid method, as discussed in the study limitations.

Please explain why you asked only for maternal (not paternal) education and only for paternal (not maternal) occupation. We appreciate this question. In low- and middle-income countries, maternal education is considered a key determinant of child health and survival. Thus, it has been commonly used as a proxy for parental education. For similar reasons, father occupation was often chosen as a proxy for parental occupation. In this study with a limited sample size, using many variables in the multivariable would not be recommendable since the sample would be shaky. We have elaborated on this in the revised manuscript.
Please define the variables: wearing shoes regularly and irregularly.

We have clearly defined these variables in a revised manuscript.

How was the reason for absenteeism for children affected by tungiasis assessed? Was this by an open question? Was it a question with multiple answers? Was only one answer possible? Was this question regarding absenteeism only for children with tungiasis or could it be answered also by children without tungiasis?

We have found these questions very relevant. Reasons for the absenteeism were explored in all children, infected or non-infected with tungiasis, through an open-ended question. However, we have reconsidered to report these reasons in our descriptive results since some of them were specific to children infected with tungiasis. Thus, the comparability between two groups was not applicable in the logistic regression analysis. The table of comparison would contain values zeros (reasons of absenteeism not found in non-infected children), which would not be analysable.

Demographic characteristics of participants, Table: 4.1 A column with the total number regarding gender and age is missing.

This comment was addressed in the current manuscript.

Analysis of factors of tungiasis infestation, Table 4.2. Did you also collect information/data about the situation in school, e.g. plastering of the school room floor? -> Schools are a possible place of transmission of tungiasis!

We have also collected the information on the school situation (e.g. classes’ floors) and reported it in the results’ section.

Strengths and limitations: Which bias do you mean (.. to minimize the bias the parents of the children were interviewed shortly after their respective works..)? Please indicate.

We appreciate this comment. The section of strengths and limitations was rewritten and we took care of addressing this comment.

Comparison with other studies: (The study does not really generate new aspects as all factors that are found out to be associated with tungiasis are already known to be such. New is that the study was conducted in Rwanda and that many aspects are similar to other countries. Maybe you should conclude it in this way.) This is a relevant point raised up. We have revised this section on comparison with other studies, considering the comment provided.

P13, passage 2: Do not generalize that people are not aware of tungiasis infestation among domestic animals.

We agree that the generalisability in this situation is not applicable. We have addressed this comment.